

ABSTRACT

A microlens array for use in a solid-state imager having an improved fill factor. The microlens array includes a plurality of microlenses, each consisting of two layers: a lower refractive layer, and an upper insulation layer. The refractive layer is formed of transparent material with a suitable refractive index which may be optical thermoplastic, polyimide, thermoset resin, photosensitive gelatin, or radiation curable resin. The insulation layer is formed of transparent insulating material such as silicon oxide, silicon nitride, or silicon oxynitride. Due to the refraction of light through the insulation layer, more light at the pixel edges is captured by each microlens, thereby improving the fill factor of the microlens array. Also disclosed are methods for forming the microlens array.

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